

Parsnip

Peter M. A. Toivonen
Agriculture and Agri-Food Canada
Pacific Agri-Food Research Centre, Summerland BC, Canada

Scientific Name and Introduction: The parsnip (*Pastinaca sativa* L.) is a native of Europe and Asia. The plant is a biennial, belonging to the Apiaceae (Umbelliferae) or parsley family. The crop is grown as an annual and the thickened, cream-color root is the edible portion. It is a long season crop (~ 100 days) and thrives best in cool growing climates. Parsnips are generally available from mid-August to March.

Quality Characteristics and Criteria: A high quality parsnip will be firm, reasonably clean and fairly smooth surfaced (not deeply ridged or with secondary rootlets). Parsnips are topped after harvesting but should not be trimmed into the crown.

Horticultural Maturity Indices: Parsnips are harvested when root diameters range from 2.5 to 7.6 cm (1 to 3 in) at the shoulder.

Grades, Sizes and Packaging: There are two grades, U.S. No. 1 and U.S. No. 2, that are based on shape, external appearance and size. Parsnips are commonly packaged in 11.4 (25 lb) perforated polyethylene bags or 5.5 kg (12 lb) cartons holding 12 cello bags of 0.5 kg (1 lb) each.

Pre-Cooling Conditions: Parsnips are similar to carrots in requirements and should be cooled using hydro-cooling or package-icing. Rapid cooling to 5 °C (41 °F) or below immediately after harvest is essential to minimize decay and moisture losses during extended storage.

Optimum Storage Conditions: Parsnip roots can be stored 4 to 6 mo at 0 to 1 °C (32 to 34 °F) with 98% RH (van den Berg and Lentz, 1973). Only healthy roots with no damage should be placed in storage.

Controlled Atmosphere (CA) Considerations: Little work has been done, but limited results suggest that there are no benefits to controlled atmosphere storage (Stoll and Weichmann, 1987).

Retail Outlet Display Considerations: Water sprinklers and top-icing are acceptable for non-packaged product. Packaged product should be held in a cold display case with no ice or water sprinklers.

Chilling Sensitivity: Not chilling sensitive.

Ethylene Production and Sensitivity: Parsnips produce very low ethylene at < 0.1 $\mu\text{L kg}^{-1} \text{h}^{-1}$ at 20 °C (68 °F). Exposure to low levels of ethylene in cold storage causes bitterness, likely due to accumulation of xanthotoxin (8-methoxypsoralen) (Johnson et al., 1973; Shattuck et al., 1988).

Respiration Rates:

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
0 °C	8 to 16
5 °C	8 to 18
10 °C	19 to 25
15 °C	30 to 43

To get mL kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day. Data are from Smith (1957) and, van den Berg and Lentz (1972).

Physiological Disorders: Surface browning is a significant problem that is largely associated with bruising and abrasion injury during harvest (Kaldy et al., 1976; Toivonen, 1992). Crops grown on coarse sandy soils are more susceptible, and there are cultivars that are resistant to browning (Kaldy et al., 1976; Toivonen, 1992). Surface browning also increases with length of storage (Kaldy et al., 1976). Postharvest dips reduce browning during storage (Toivonen, 1992). Waxing parsnips, to reduce moisture loss, will increase browning (Plantenius, 1939).

Postharvest Pathology: Diseases of importance during storage, transit and marketing are parsnip canker (*Itersonilia perplexans* Derx.), gray mold rot (*Botrytis cinerea* Pers.:Fr.), bacterial soft rot (*Erwinia carotovora* (Jones) Bergey et al.) and watery soft rot (*Sclerotinia sclerotiorum* (Lib.) de Bary) (Smith et al., 1982). Some cultivars are resistant to parsnip canker (Davis et al., 1989).

Quarantine Issues: None.

Suitability as Fresh-cut Product: No potential.

Special Considerations: The highest freezing temperature is -0.9 °C (30.4 °F). An important component of parsnip quality is sweetness, which is enhanced if exposed to fall frosts before harvest. However, early-harvested parsnips can also be induced to sweeten using short-term cold storage (Shattuck et al., 1989).

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Veg. Mkt. Comm. website “Vegetable Facts” at <http://www.bcveg.com/vegfacts/parsnip.html>.